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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/739,452	12/17/2003	Keita Hirai	60490.(50498)	9346

21874 7590 01/17/2007
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EXAMINER	
SAVAGE, JASON L	
ART UNIT	**PAPER NUMBER**
1775	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/739,452	HIRAI ET AL.	
	Examiner	Art Unit	
	Jason L. Savage	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20031217*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites 'The tool part' in line 1 however the claim depends from method claims 6 or 7 and the limitation in the claim is drawn to the processing temperature. As such, it is the position of the Examiner that the claim preamble intended to recite –The Method— instead.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai'955 (US 5,864,955) in view of Ryota (US 2005/0025655).

Hirai'955 teaches a powdered sintered multi-layer tool part comprising a first metal layer of a titanium alloy having high hardness and a second soft metal layer having a lower hardness wherein the powder layers are pressed and sintered to form the tool at a temperature of 1100 to 1300°C (col. 1, ln. 51-64).

Hirai'955 is silent to the first layer being high in hardness comprising a vanadium carbide powder. However, Ryota teaches a powdered sintered tool part which is high in wear resistance, high in hardness and low in specific gravity wherein the tool comprising a superhard mixture of titanium alloy and vanadium carbide powders of between 10-90 weight% of the mixture which are pressed and sintered at a temperature below 1500°C (par [0005-0006]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the multi-layer tool of Hirai'955 by substituting the superhard mixture of titanium and vanadium carbide as taught by Ryota in order to have produced a tool having higher wear resistance and higher hardness.

Regarding claims 2 and 7, Ryota further teaches that the titanium alloy may contain 2-10% of Co in order to fill any air holes within the titanium layer (par [0025-0027]). It would have been obvious to one of ordinary skill in the art to have added Co to the titanium layers in order to have eliminated the formation of air holes within the layers.

Regarding claims 3 and 8, Ryota teaches the hardness of the first metal layer is 60 HRA or greater (par [0006]) and Hirai'955 teaches the hardness of the second soft titanium layer is substantially less than 70 HRA (col. 1, ln. 52-64). Although Ryota does not exemplify an embodiment wherein the Hardness is within the claimed range, since it teaches the same materials in the same proportions one would have expected the hardness of the material to be within the claimed range.

Regarding claims 5 and 10, although the references are silent to the means used for mounting the tools to other tools, both are provided with mounting means such as holes (Figure 1 in Hirai'955, Figure 1 in Ryota). It would have been within the purview of one of ordinary skill to have recognized that the tools taught by the prior art could be mounted or secured to any other tool by any known or conventional mounting method including those claimed by Applicant with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results, the claimed mounting methods would not provide a patentable distinction over the prior art.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryota (US 2005/0025655) in view of Hirai'955 (US 5,864,955).

Ryota teaches a powdered sintered tool part which is high in wear resistance, high in hardness and low in specific gravity wherein the tool comprising a superhard mixture of titanium alloy and vanadium carbide powders of between 10-90 weight% of the mixture which are pressed and sintered at a temperature below 1500°C (par [0005-0006]).

Ryota is silent to the tool part being a multi-layer tool comprising a second soft metal layer of titanium which is integrally joined to a first superhard layer. Hirai'955 teaches a powdered sintered multi-layer tool part comprising a blade edge layer of a titanium alloy having high hardness and a second soft metal layer forming the body which has a lower hardness wherein the powder layers are pressed and sintered to form the tool at a temperature of 1100 to 1300°C (col. 1, ln. 51-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the tool Ryota by following the teachings of Hirai'955 and formed a multi-layer tool wherein the cutting edge comprises the superhard material and the body comprise a softer metal layer.

Regarding claims 2 and 7, Ryota further teaches that the titanium alloy may contain 2-10% of Co in order to fill any air holes within the titanium layer (par [0025-0027]). It would have been obvious to one of ordinary skill in the art to have added Co to the titanium layers in order to have eliminated the formation of air holes within the layers.

Regarding claims 3 and 8, Ryota teaches the hardness of the first metal layer is 60 HRA or greater (par [0006]) and Hirai'955teaches the hardness of the second soft titanium layer is substantially less than 70 HRA (col. 1, ln. 52-64). Although Ryota does not exemplify an embodiment wherein the Hardness is within the claimed range, since it teaches the same materials in the same proportions one would have expected the hardness of the material to be within the claimed range.

Regarding claims 5 and 10, although the references are silent to the means used for mounting the tools to other tools, both are provided with mounting means such as holes (Figure 1 in Hirai'955, Figure 1 in Ryota). It would have been within the purview of one of ordinary skill to have recognized that the tools taught by the prior art could be mounted or secured to any other tool by any known or conventional mounting method including those claimed by Applicant with a reasonable expectation of success. Absent

a teaching of the criticality or showing of unexpected results, the claimed mounting methods would not provide a patentable distinction over the prior art.

Claims 1, 3-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai'941 (JP 2002-346941 English Machine Translation).

Hirai'941 teaches a powdered sintered multi-layer titanium tool part comprising a first metal layer of a titanium alloy having high hardness and a second soft metal layer having a lower hardness which are pressed and sintered (abs). Hirai'941 further teaches that the titanium content in the high hardness material is 50% or more (DETAILED DESCRIPTION – par[0010]). Hirai'941 also teaches that the first high hardness layer may comprise titanium powder mixed with additives such as metallic carbide particles (DETAILED DESCRIPTION – par[0012]).

Hirai'941 is silent to the high hardness layer comprising a vanadium carbide powder. However, it would have been obvious to one of ordinary skill in the art to have recognized that a high hardness carbide material such as vanadium carbide could be added with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the carbide being vanadium carbide, it would not provide a patentable distinction over the prior art.

Regarding claims 3 and 8, Hirai'941 teaches that the hardness of the super hard layer is between 40-60 HRC (70.4-81.8 HRA) and the hardness of the soft layer is less than 40 HRC (70.4 HRA) (DETAILED DESCRIPTION – par[0006]).

Regarding claims 4 and 9, the sintering temperature is between 1000-1400°C (DETAILED DESCRIPTION – par[0014]).

Regarding claims 5 and 10, Hirai'941 is silent to the multilayer tool being mounted to other tools by the claimed methods, it would have been within the purview of one of ordinary skill in the art to have recognized that the claimed multilayer part could be formed into a wide variety of products that could be suitably mounted to other tools by any known or conventional mounting method including those claimed by Applicant with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results, the claimed mounting methods would not provide a patentable distinction over the prior art.

However, Ryota teaches a powdered sintered tool part which is high in wear resistance, high in hardness and low in specific gravity wherein the tool comprising a superhard mixture of titanium alloy and vanadium carbide powders of between 10-90 weight% of the mixture which are pressed and sintered at a temperature below 1500°C (par [0005-0006]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the multi-layer tool of Hirai'955 by substituting the superhard mixture of titanium and vanadium carbide as taught by Ryota in order to have produced a tool having higher wear resistance and higher hardness.

Regarding claims 2 and 7, Ryota further teaches that the titanium alloy may contain 2-10% of Co in order to fill any air holes within the titanium layer (par [0025-0027]). It would have been obvious to one of ordinary skill in the art to have added Co to the titanium layers in order to have eliminated the formation of air holes within the layers.

Regarding claims 3 and 8, Ryota teaches the hardness of the first metal layer is 60 HRA or greater (par [0006]) and Hirai'955 teaches the hardness of the second soft titanium layer is substantially less than 70 HRA (col. 1, ln. 52-64). Although Ryota does not exemplify an embodiment wherein the Hardness is within the claimed range, since it teaches the same materials in the same proportions one would have expected the hardness of the material to be within the claimed range.

Regarding claims 5 and 10, although the references are silent to the means used for mounting the tools to other tools, both are provided with mounting means such as holes (Figure 1 in Hirai'955, Figure 1 in Ryota). It would have been within the purview of one of ordinary skill to have recognized that the tools taught by the prior art could be mounted or secured to any other tool by any known or conventional mounting method including those claimed by Applicant with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results, the claimed mounting methods would not provide a patentable distinction over the prior art.

Claims 2 and 7are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai'941 (JP 2002-346941 English Machine Translation) in view of either Ryota(US 2005/0025655) or Paton et al (US 4,299,626).

Hirai'941 teaches what is set forth above but is silent to the tool further containing cobalt powder.

Ryota teaches the formation of a tool by mixing a powder of titanium material with other additives and pressing and sintering (par[0006]). Ryota further teaches that it is desirable to add 2-10% of Co in order to fill any air holes within the titanium layer (par [0025-0027]).

Paton teaches a titanium part which has improved good mechanical and physical properties due to the addition of a beta stabilizing element such as cobalt (col. 1, ln. 54 – col. 2, ln. 5).

It would have been obvious to one of ordinary skill in the art to have added known alloying materials such as cobalt to the powder mixture of Hirai'941 in order to have improved to the properties of the formed titanium tool part.

Prior Art Made of Record but not Relied Upon

The following is a listing of prior art made of record but not relied upon in the rejections above:

Hirai'369 (JP 11-293369 English Machine Translation) teaches a lightweight part suitable for use as cutting tools which is formed by mixing powders of titanium,

aluminum-vanadium and vanadium carbide and is then pressed and sintered (DETAILED DESCRIPTION – par[0001 and 0006]).

Kaba et al. (US 5,534,353) teaches sintered component part having good corrosion resistance, abrasion resistance and high strength (col. 1, ln. 8-12). Kaba further teaches that the part is formed by uniformly dispersing powders of various composed in titanium (col. 2, ln. 11-31). Kaba further teaches that carbides such as vanadium carbide may be used as hard compound which are dispersed within the titanium alloy (col. 3, ln. 34-45).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason Savage
1-8-07

JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
1/8/7